J. Indian Fish Assoc., 35: 19-27, 2008

CONSUMPTION PATTERN AND CONSUMER PREFERENCE FOR VALUE- ADDED FISH AND FISH PRODUCTS IN NORTH ZONE OF INDIA

Sunil Sabat, Arpita Sharma* and Shyam S. Salim
Central Institute of Fisheries Education (Deemed University)
Indian Council of Agricultural Research
Department of Fisheries Informatics Technology Evaluation and Transfer
Seven Bungalows, Versova, Mumbai-400061
Corresponding author- arpitasharma@cife.edu.in

ABSTRACT

Present paper attempts to analyze consumption pattern and consumer preferences towards value-added fish and fish products in north zone of India. Results reveal that socio economic variables affect consumption of value-added fish and fish products. A total of 49 percent respondents were of middle age group (35 to50 years). All were literates except 7 percent from the rural area. All were purchasing fish at least once in 15 days. A total of 90 percent respondents in rural, 77 percent in semi urban and 50 percent in urban area were unaware of value-added fish and fish products. About 10 percent of respondents had consumed it, out of which most were from urban area. Demand analysis by Cobb Douglas (CD) Demand function; revealed that when price of fish, price of the substitutes, income of family and family size were used as independent variables, variation in demand of fish explained by CD Demand function was about 39 percent in urban area, 24 percent in semi urban area and 22 percent in rural area. From Garette ranking technique major problems in fish consumption found were irregular supply, lack of fresh fish, high price and presence of bones in fish. While lack of awareness, unavailability, no preference and unacceptable taste were major problems for consumption of value-added fish and fish products.

Key words: Consumption, consumer preference, value-added fish products.

INTRODUCTION

Fisheries sector has witnessed an impressive growth from a subsistence traditional activity to a well-developed commercial and diversified enterprise. It has been playing a pivotal role in the economic development by virtue of its potential contribution to employment generation, income augmentation, addressing food and nutritional security concerns and foreign exchange earnings. World fish production has increased immensely and the capture fishery has arrived at a state of over exploitation. An alarming increase in human population is resulting in widening the supply-demand gap, with the consequences of reduced availability, rising price and search for alternative resources to meet the gap (Clark , 1990).On other hand about one third of the global fish catch is under utilized for human food consumption because of post-harvest losses. Fish in large quantities are discarded into sea as it is currently uneconomic to preserve and bring them ashore

like shrimp by-catch of about 27million tonnes/year mostly due to the low market value of the material, size, species composition and the lack of suitable refrigerated storage space on-board. Non-preferable low priced fishes are either converted to fish meal or sold at very low price for curing. In general deep-sea fishes may not be immediately acceptable to the consumers due to unfamiliarity in shape, size and colour of the new varieties. These low priced fishes are nutritionally and chemically in no way inferior to that of fishes of commercial importance. Therefore, collecting and processing meat of these fishes into diversified value-added products suiting to human consumption would result in effective utilization of the resource. This can meet the desire for better and new taste with commercial benefits. Moreover, purchasing capacity of people is going to enhance in years to come and market prices are going to be high for fish. 'Value addition' is defined as any additional activity that changes the nature and form of raw material and increases sale value and in general improves the utility.

Marketing of value-added fish products is completely different from traditional seafood trade. It is dynamic, sensitive, complex and expensive. Market surveys, packaging and advertising are a few of the very important areas, which ultimately determine successful movement of new products. Most market channels currently used may not be suitable to trade value-added fish products. A new appropriate channel would be supermarket chain; which want to procure directly from source of supply. Though, market research has been conducted in the field of fresh and frozen fish but still the domain of value-added fish and fish products remain less explored. In this context the present study was undertaken to analyze the consumption pattern and consumer preferences towards value-added fish and fish products in north zone of India with the objective of analyzing the consumption pattern and consumer preferences towards value-added fish and fish products.

DESIGN OF STUDY

Haryana, Punjab and Delhi were chosen as the States for survey under the study. A sample of 90 respondents was taken from the selected area with 30 from Delhi (metro/urban), 30 from Rohtak (semi urban), Haryana and 30 from Lahili (rural), Haryana. The size of the sample was decided as the above as the objective was to draw inference about the population (Gupta and Gupta, 1997). To analyze the consumption pattern and consumer preferences, data were collected with prestructured consumer survey questionnaires from varied strata of society like high, middle and low income.

Collected data were analyzed using specific tools of analysis like percentage analysis and functional analyses like Demand analysis (Cobb-Douglas Demand function) and Garette ranking technique to access the consumption pattern and consumer preference towards value-added fish and fish products.

TOOLS OF ANALYSIS

Percentage analysis

In this method all the variables like income, education level, age, family structure, awareness level and fish consumption have been expressed in the form of percentage.

Functional analysis

These following tools were used for functional analysis of result.

- Demand analysis
- Garret ranking

Demand analysis

Demand is the quantity of a product or service, which buyers will purchase at the different prices in a market at a given period of time (Levy, 1985). Demand function is a mathematical expression of the relationship between the quantity demanded of a commodity and factors affecting the quantity demanded (Hal, 1992), e.g. the quantity of fish demanded is determined by the price of fish, price of the substitute, income levels, the population, average education level etc. The demand function is expressed as

$D_t = f(P_t, P_s, Y_t, S_t, E_t, D_{t-1})$

Where,

D_t = quantity of fish demanded

P_t = price of the fish in period t

P_s = price of the substitute

Y_t = average income level

S_t = size of the population in period t

E_t = average level of education in period t

D_{t-1} = quantity of fish demanded in period t-1

Cobb-Douglas Demand Function

In order to forecast demand based on different variables, a Cobb Douglas (CD) demand function (Cobb and Douglas, 1928) was employed on different sets of independent variables. The dependent variable was Y= demand, independent variables were X_1= price of fish, X_2= price of the substitutes, X_3= income of the family, X_4= family size, X_5=age of the respondents, X_6= quantity demanded of substitutes, X_7= expenditure on fish.

CD Demand function can be expressed as:

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} X_6^{b6} X_7^{b7} e^{u}$$

Where a = Intercept

e^{u} = Error term

(b1, b2, b3, b4, b5, b6, b7) are coefficients

To convert it into linear form we have taken log on both sides. Hence the linear form of CD Demand function is:

$$\ln Y = ß + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X7 + u$$

Where ß= ln a

b_1, b_2 and b_3 represent the price elasticity of demand, price elasticity of substitutes and income elasticity of demand respectively.

Garette Ranking Technique

The Garette Ranking Technique was employed to rank the problems in consumption of fish and value-added fish product of consumers. Order of merit given by the consumers was transmitted into scores. For converting scores assigned by the consumers towards a particular problem,

percent position was worked out using the formulae (Garrett and Woodsworth, 1969).

$$\text{Percent position} = 100\,(R_{ij}-0.5)/N_j$$

Where,

R_{ij} = rank given for the i^{th} problem by the j^{th} consumer

N_j = number of attributes

RESULTS AND DISCUSSION

Percentage Analysis

Results obtained from percentage analysis were segregated under various heads. General information category contained age, family structure and education level. Results showed that 49% respondents were from middle age i.e., group 35 to 50 years. All respondents were literate except 7 per cent who were illiterate from the rural area. There were more number of graduates (43 per cent) and professional degree holders (17 per cent) from urban area. Most of the rural respondents were from agriculture sector. Number of respondents in private jobs was higher than government ones especially in urban area. A total of 50 per cent semi urban respondents belonged to manufacturing sector. Most of the respondents in urban area (about 60 per cent) were having annual income above Rs. 3,00,000/- while for respondents from semi urban and rural area the range was Rs. 60,000 to 3,00,000/- Respondents with less than Rs. 60,000 annual income were more in rural area (20 per cent) as compared to other areas. Percentage of respondents with their own land and house were more in rural area while all urban respondents possessed own consumer durables. More respondents in urban and semi urban area had own vehicles. All respondents spent highest percentage of expenditure on food.

To analyze the consumption pattern and consumer preference for value-added fish and fish products, information was collected as regards to frequency of fish purchase, awareness and consumption of value-added fish and fish products. Results revealed that all the respondents were purchasing fish at least once in 15 days. Maximum number of respondents had frequency of fish purchase once in a week (63 per cent) followed by more than once in a week (30 per cent). Most of the respondents in rural (90 per cent) and in semi urban area (77 per cent) were unaware of value-added fish and fish products while 50 per cent respondents in urban area were aware of it. About 10 per cent had consumed value-added products of fish out of which maximum were from urban area and minimum were from rural area. As regards to consumer preference it was clearly reported by all respondents that they had a preference for boneless fish products. Moreover, the fisheries departments also have reported that they would like to have government support for the procurement of deboning machines.

Demand analysis

In Demand analysis (Cobb Douglas Demand Function) when price of fish, price of the substitutes, income of family and family size were used as independent variables, in urban area the CD Demand function could explain about 39 per cent of variation in demand of fish while income and family size significantly affected the demand of fish (Table 1), in semi urban area the CD Demand function could explain about 24 per cent of variation in

demand of fish while family size significantly affected the demand of fish (Table 2); the CD Demand function could explain about 22 per cent of variation in demand of fish while Income and family size significantly affected the demand of fish (Table 3).

In a study, Redkar and Bose (2004) investigated the factors affecting the purchase decisions of seafood consumers in selected urban areas of India. They reported that taste, religion, size of household and age of family member were significant factors at 95 per cent confidence level.

Garette ranking:

With the results obtained from Garette ranking of problems in fish consumption it was seen that irregular supply, lack of fresh fish and high price were major problems in fish consumption. In addition, all the respondents had a problem with the presence of bones in fish. Many of them had a preference for boneless fish and fish products like fish pakora and fish cutlet (Table 4). With the results obtained from Garette ranking of problems for value-added fish and fish products consumption, it was ascertained that north Indian respondents were ready to pay a reasonable amount for value-added fish and fish products, but the dilemma is that neither the product nor any range of products was available in the market. At the same time some have also shown lack of appreciation for the taste for these products. Lack of awareness, unavailability, no preference and unacceptable taste were the major problems for consumption of value-added fish and fish products (Table 5).

There appear to be few problems perceived as regards to the consumption of value-added fish and fish products in households and these influences may lead to vague and uncontrolled drifts in consumption patterns. Active market promotion can play a significant role in bringing change. The extent to which this can be achieved should be of great interest to development planners, policy makers and the trade in general, because of significant social, political and economic benefits.

Table 1. Demand analysis of urban area

Adjusted R Square	0.393974			
	Coefficients	***Standard Error***	***t Stat***	***P-value***
Intercept	-0.66761	0.446174	-1.49631	0.147092
PRICE	-0.16816	0.201929	-0.83275	0.412872
PRIs	-0.07857	0.068425	-1.14828	0.261723
INCOME	0.288602	0.133493	2.161917	0.040396
FAMILY SIZE	0.662152	0.298913	2.215197	0.036084

CD Demand function: $Y = -0.66761\ X_1^{-0.16816}\ X_2^{-.07857}\ X_3^{0.28860}\ X_4^{0.66215}$

Table 2. Demand analysis of semi urban area

Adjusted R Square	0.249909			
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.12194	1.04238	-0.11698	0.907849
PRICE	0.001708	0.692497	0.002466	0.998053
PRIs	0.055601	0.048458	1.147412	0.262521
INCOME	0.045552	0.124088	0.367098	0.716763
FAMILY SIZE	0.909928	0.276482	3.291092	0.003078

CD Demand function: $Y = -0.12194\ X_1^{0.001708} X_2^{0.055601} X_3^{0.045552} X_4^{0.909928}$

Table 3. Demand analysis of rural area

Adjusted R Square	0.218064			
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.040615	1.459838	0.027822	0.978025
PRICE	-0.93453	1.057146	-0.88401	0.385112
PRIs	-0.0887	0.056612	-1.56679	0.129735
INCOME	0.392124	0.141709	2.767106	0.010487
FAMILY SIZE	0.760231	0.326737	2.326737	0.028377

CD Demand function: $Y = 0.040615 X_1^{-0.93453} X_2^{-0.0887} X_3^{0.392124} X_4^{0.760231}$

Table 4. Analysis of the problems in fish consumption - Garette ranking technique

Sl. No	Problems	Urban area		Semi urban area		Rural area	
		Mean score	Rank	Mean score	Rank	Mean score	Rank
1	Irregular supply	59.2	1	69.7	1	57.2	4
2	lack of fresh fish	48.4	7	60.8	2	42.3	8
3	Wide fluctuation in price	56.7	3	50.3	7	58	3
4	Non availability of preferable fishes	55.1	5	45.3	8	41.7	9
5	Health aspects	39.1	10	30.3	11	38	10
6	Religious aspect	35.2	11	34.3	10	52.2	5
7	Highly perishable	52.6	6	45.0	9	45.2	7
8	High price	57.4	2	56.6	3	68.8	1
9	Lack of Quality/hygiene	48.3	8	50.8	5	50.1	6
10	Nearness to the source of purchase	42.1	9	50.8	6	31.7	11
11	Others(bones in fish)	55.7	4	55.9	4	64.8	2

Table 5. Analysis of the problems as regards to value-added fish and fish products consumption - Garette ranking technique

Sl. No	Problems	Urban area		Semi urban area		Rural area	
		Mean score	Rank	Mean score	Rank	Mean score	Rank
1	Lack of awareness	68.3	2	57	3	70.2	1
2	Not available	57.8	1	57.7	2	52.7	5
3	Ranges of products are unavailable	53.6	3	43.5	6	40	7
4	Taste is unacceptable	51	5	52.1	4	53.7	4
5	Inferior quality	44.1	7	40	8	36.3	9
6	Products are expensive	52.1	4	52.0	5	58	3
7	Lack of quality and hygiene	36.1	9	39.5	9	41.4	6
8	Nearness to the source of purchase	36.9	8	41.7	7	39.7	8
9	No preference	50.1	6	66.5	1	58.0	2

CONCLUSION

The present paper attempts to analyze the consumption pattern and consumer preferences towards value-added fish and fish products. The result reveals that socio economic variables affect the consumption of value-added fish and fish products. In Demand analysis by Cobb Douglas Demand function; when price of fish, price of the substitutes, income of family and family size were used as independent variables, the variation in demand of fish explained by CD Demand function was about 39 per cent in urban area, 24 per cent in semi urban area and 22 per cent in rural area. From Garette ranking technique the major problems in fish consumption found were irregular supply, lack of fresh fish, high price and bones in fish. While lack of awareness, unavailability, no preference and unacceptable taste are the major problems for consumption of value-added fish and fish products. It could be a guide to both the producers and marketers of fish and fish products to produce products of desired quality and good price in the market.

REFERENCES

Clark, C. W., 1990. Mathematical Bioeconomics: The Optimal Management of Renewable Resources, John Wiley and Sons. Inc. New York.7-14PP.

Cobb, W. and P. H. Douglas, 1928. A Theory on Production, *American Economic Review,*18 (Supplement):139-165.

Garrett, H.E. and R. S. Woodsworth, 1969. Statistics in Psychology and Education. Vakils, Feffer & Simons Pvt. Ltd., Mumbai, 323-329.

Gupta, S.P. and M. P. Gupta, 1997. Business Statistics, Sultan Chand and Sons, Delhi.400P.

Hal, R. V., 1992. Microeconomic Analysis W.W. Norton and Company Inc. USA.9-32PP.

Redkar, S. B. and S. Bose, 2004. Modeling Purchasing Decisions of Seafood Products. A Case Study of Mumbai, India. *International Journal of Consumer Studies,* 28 (1): 75-82.

Levy, S, 1985. Factor Demand Functions for constant returns to Scale Technologies, *Southern Economic Journal*, 51 (3): 860-867.